DOE Performance Assessments and Composite Analyses

Spills, Leaks, and Other Contamination

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Background
DOE Performance Assessments

- DOE Performance Assessments (PA) typically do not include spills, leaks, and residual contamination
  - Focused on understanding design, operation, waste form, and inventory requirements

Background
DOE Performance Assessments

- Cleanup of spills, leaks, and residual contamination performed under CERCLA/ RCRA
  - Cleanup activities under CERCLA are not subject to 3116 determination
  - Source term captured in Composite Analysis (CA)

Evolution of Composite Analysis

- Performance Assessments for facilities and specific actions, e.g. Saltstone Disposal Facility
- DOE sites not typical of 10 CFR 61 siting considerations
  - Existing contamination
  - Multiple units
  - Interacting source terms
  - Some limitations determined by historical large site decisions, e.g., Hanford Reservation, SRS

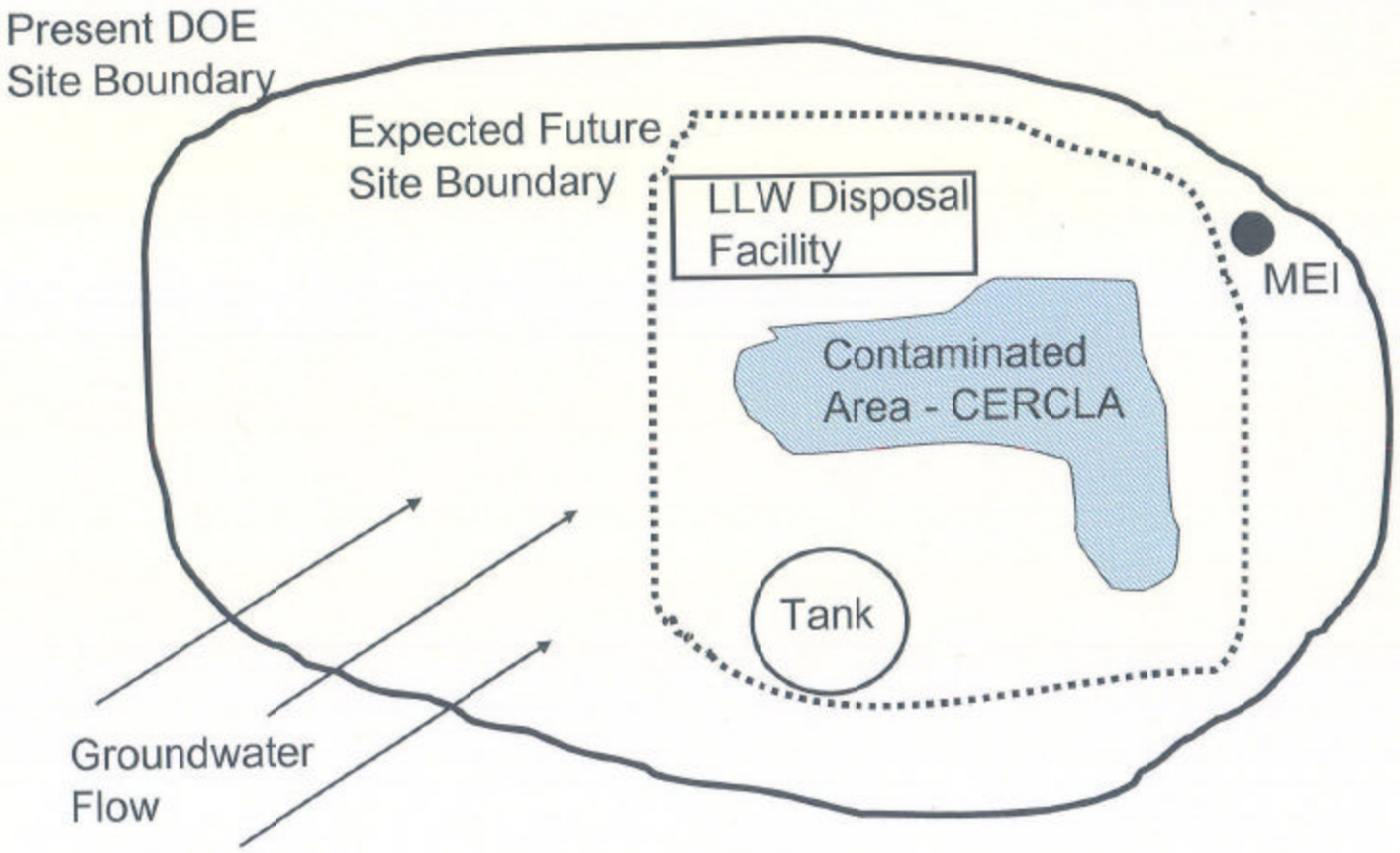
Evolution of Composite Analysis

- DOE Order 5400.5, *Radiation Protection of the Public and Environment*, requires:
  - exposure of members of the public to radiation sources as a consequence of all routine DOE activities shall not cause, in a year, an effective dose equivalent greater than 100 mrem (1 mSv)
  - From DOE's responsibility under the AEA to protect public and the environment
  - Same as NCRP, ICRP, IAEA

Evolution of Composite Analysis

- Composite Analysis developed in response to DNFSB 94-2 and incorporated into DOE O 435.1
  - Accounts for all sources of radioactive material that may interact with the disposal facility, contributing to dose projected to hypothetical member of the public.
  - 100 mrem limit
    - 30 mrem performance measure
    - Hypothetical member of the public, MEI
  - Evaluated for 1,000 years following facility closure.
  - CA results used for planning, radiation protection activities, and future use commitments.

Conceptual CA Model



Role of PAs vs. CAs

- DOE uses CA to inform understanding of interacting source terms, including leaks, spills, and residual contamination
  - Used for planning, radiation protection, and future use commitments
  - Help preserve focus on PA purpose – tank closure/residuals

Spills, Leaks, and Other Contamination

- CERCLA/RCRA address cleanup of widespread and residual contamination
- CERCLA Performance Objectives
  - 15 mrem all pathways
  - Clean Water Act
    - 4mrem/yr β-γ
    - 15 pCi/L α

Hanford

- Spills, Leaks, and Other Contamination
  - Discharges to soil column (Cribs & trenches) – *not included in SST PA or waste determination*
  - SSTs known to have leaked – *included in SST PA, not included in waste determination*
    - *Included in SST PA per TPA*
    - *Not relevant to determination - different occurrence times*
  - Residual radiological inventory in piping, boxes, ancillary equipment – *included in SST PA and waste determination*
  - Other spills and contamination in tank farms (transfers & handling) – *included in SST PA, not included in waste determination*

Hanford

- Closure and Residual Contamination
  - TPA requires a single PA covering all SSTs that includes consideration of all sources
    - For retrieval consideration – TPA requires removal of at least 99% of waste by volume
    - Any individual tank determinations will not include past leaks
  - All residual contamination being addressed under CERCLA/RCRA
    - CERCLA performance objectives

Idaho

- Spills, Leaks, and Other Contamination
  - No discharges to the soil column
  - No leaks from tanks
  - Residual radiological inventory in piping, boxes, ancillary equipment – *included in TFF PA and 3116 determination*
  - Other spills and contamination (transfer & handling) – *not included in TFF PA or 3116 determination*

Idaho

- Closure and Residual Contamination
  - State requires submittal of RCRA Closure Plan for individual or groups of facilities
  - All residual contamination being addressed under CERCLA
    - 2 of 4 Tank Closure Plans already approved by State

Savannah River

- Spills, Leaks, and Other Contamination
  - No discharges to soil column
  - No significant leaks from tanks
  - Residual radiological inventory in piping, boxes, ancillary equipment – *included in Tank Farm PA and 3116 determination*
  - Other spills and contamination (transfer & handling) – *not included in Tank Farm PA or 3116 determination*

Savannah River

- Closure and Residual Contamination
  - State Agreement requires general closure plan for all tanks and closure modules for individual tanks
  - All residual contamination being addressed under CERCLA/RCRA
    - CERCLA performance objectives

West Valley

- Spills, Leaks, and Other Contamination
  - No leaks from underground tanks
  - Insignificant low activity discharges to soil from piping leaks
  - Residual radiological inventory in piping, pits, processing plant and NRC permitted disposal area – *included in Site PA*
  - Other spills and contamination (transfer & handling) – *included in Site PA*

West Valley

- Closure and Residual Contamination
  - State requires submittal of RCRA Clean Closure Plan for groups of facilities
  - All residual chemical contamination being addressed under RCRA
  - Performance objectives defined by NRC:
    - 25 mrem/yr plus ALARA considerations
    - 100 mrem/yr, if institutional controls fail
    - 500 mrem/yr, if 100 mrem/yr is not technically achievable or prohibitively expensive